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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/736,183	12/15/2003	Lucas D. Barkley	2003-0504.02	4334
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LEXMARK INTERNATIONAL, INC. INTELLECTUAL PROPERTY LAW DEPARTMENT 740 WEST NEW CIRCLE ROAD BLDG. 082-1 LEXINGTON, KY 40550-0999			NGUYEN, LAM S	
			ART UNIT	PAPER NUMBER
			2853	

DATE MAILED: 05/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/736,183

Applicant(s)

BARKLEY ET AL.

Examiner

LAM S. NGUYEN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 5-7, 11-17, and 30-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Kao et al. (US 2002/0018086 A1).

Referring to claims 1, 7, 12, 16-17, 30-32:

Kao et al. discloses a method for providing a plurality of fire pulses (*FIG. 9, elements 438, 435: First and second heating pulses*) in an ink jet printer, comprising the steps of:

producing a plurality of fire signals specific to a particular color (*FIG. 9-10: The first heating pulse and the second heating pulse are provided to the printhead 460 for firing the color ink contained in the printhead*), each fire signal of said plurality of fire signals being asserted at a different timing than other of said plurality of fire signals (*FIG. 10, elements 435, 438: The first and second heating pulses are provided at a different timing*); and

combining said plurality of fire signals to form a composite fire signal that maintains said different timing and specific to the particular color (*Fig. 10: The first and second heating pulses, specific to the color ink contained in the printhead, are combined in the period T1-2 to produce the combination signal R1, in the period T2-3 to produce the combination signal R2, etc.*)

Referring to claims 5, 13: wherein each of said plurality of fire signals includes a prefire (*FIG. 10: The first heating pulse*) signal and mainfire signal (*FIG. 10: The second heating pulse*), which are actuator fire signals.

Referring to claims 6, 14: wherein said combining step includes at least one of said plurality of fire signals interlaced with another of said plurality of fire signals (*FIG. 10*).

Referring to claim 7: a printhead carrier (*FIG. 13, element 520: A corresponding carrier that carries the ink jet printhead*) and a controller communicatively coupled to said printhead carrier for producing a plurality of fire signals (*FIG. 13, elements 510, 535, 538, 500*).

Referring to claims 11, 15: wherein said controller forms a plurality of composite fire signals, each including a corresponding plurality of actuator fire signals (*FIG. 9: Signals R1-R4*).

2. Claim 30 is rejected under 35 U.S.C. 102(b) as being anticipated by Umezawa et al. (US 6276776).

Umezawa et al. discloses a method for providing a plurality of fire pulses (*FIG. 3: Four fire pulses*) in an ink jet printer, comprising the step of producing a plurality of fire signals specific to a particular color (*FIG. 3: Four fire pulses, each associates with a particular printhead. Column 10, lines 8-10: A plurality of recording heads corresponding to a plurality of inks different in color*), each fire signal of said plurality of fire signals being asserted at a different timing than other of said plurality of fire signals (*FIG. 3: Each of four pulses is asserted at one timing period different than that of the other three*).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 18-19, 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inui et al. (US 6344867) in view of Sueoka et al. (US 6024439).

Inui et al. discloses a printhead cartridge for a thermal printer, comprising:

a plurality of actuators (*FIG. 7, elements R1-R1024*);

an actuator firing logic circuit (*FIG. 7, elements FET1-FET1024, 51-55*)

in communication with said plurality of actuators for selectively energizing said plurality of actuators, and

a decoder circuit (*FIG. 7, element 57*) in communication with said actuator firing logic circuit, said decoder circuit including at least one input for receiving at least one composite fire signal (*FIG. 7: The DECODER 57 receives the COMBINED HEATING DATA signal*).

Inui et al. does not disclose wherein the thermal printer is an ink jet thermal printer having an inkjet printhead comprising a plurality of nozzles for ejecting ink associated with a plurality of actuators, wherein ink is provided from an ink reservoir.

Sueoka et al. discloses a thermal printer having an ink reservoir for providing ink to an ink jet printhead, in which a thermal energy is acted on a liquid/ink for abruptly heating the liquid/ink to generate bubble and whereby for ejecting a liquid/ink droplet of the liquid/ink within a liquid/ink passage through ejection opening (nozzle) (*column 1, lines 20-26*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time

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invention was made to replace the printhead in Inui et al.'s printer by the thermal ink jet printhead as disclosed by Sueoka et al. The motivation for doing so would have been to obtain the advantages of the ink jet printheads that are low noise and capability of high speed printing as taught by Sueoka et al. (*column 1, lines 20-22*).

- **Inui et al. also discloses the following claimed invention:**

Referring to claims 19, 25: wherein said decoder circuit decodes said composite fire signal into a plurality of actuator fire signals (*Fig. 7: The DECODER decodes the combined heating signal to output two signals each provided to element 51 and 52*).

4. Claims 20-21 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inui et al. (US 6344867) in view of Sueoka et al. (US 6024439), as applied to claims 18 and 24, and further in view of Umezawa et al. (US 6276776).

Inui et al., as modified, discloses the claimed invention as discussed above except wherein said at least one composite fire signal includes a plurality of color composite fire signals and wherein said at least composite fire signals is associated with a plurality of ink colors.

Umezawa et al. discloses a controller in a printing apparatus for providing a plurality of fire pulses (*FIG. 3: Four fire pulses are associate with four different color recording heads*) in an ink jet printer, wherein each of the plurality of fire signals specific to a color recording head (*FIG. 3: Four fire pulses, each associates with a particular printhead. Column 10, lines 8-10: A plurality of recording heads corresponding to a plurality of inks different in color*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the composite fire signal disclosed by Inui et al. to be associate to a color ink as disclosed by Umezawa et al. The motivation for doing so would have been to drive

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multiple color printheads independently in order to perform a multi-color mode by recording using different color ink or a full-color mode by recording using color mixing as taught by Umezawa et al. (*column 10, lines 10-16*).

5. Claims 22-23 and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inui et al. (US 6344867) in view of Sueoka et al. (US 6024439), as applied to claims 18 and 24, and further in view of Kao et al. (US 2002/0018086 A1).

Inui et al., as modified, discloses the claimed invention as discussed above except wherein each said composite fire signal includes a plurality of actuator fire signals, each actuator fire signal including a prefire signal and mainfire signal and wherein each said composite fire signal includes a plurality of actuator fire signals, at least one said plurality of actuator fire signals interlaced with an other said plurality of actuator fire signals.

Kao et al. discloses an ink jet printhead driven by a plurality of fire signals wherein each of the plurality of fire signals includes a prefire (*FIG. 10: The first heating pulse*) signal and mainfire signal (*FIG. 10: The second heating pulse*), and wherein one of the plurality of fire signals is interlaced with another of the plurality of fire signals (*FIG. 10*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the fire signals disclosed by Inui et al. to include a prefire signal and a mainfire signal as disclosed by Kao et al. The motivation for doing so would have been to be able to control the ejection energy applied to the printing elements by supplying the prefire signal to preheat the ejection cells as taught by Kao et al. (*column 6, lines 42-47*).

6. Claims 2-4 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kao et al. (US 2002/0018086 A1) in view of Inui et al. (US 6344867).

Kao et al. discloses the claimed invention as discussed above and also teaches a plurality of nozzles for ejecting ink (*FIG. 1, element 82*), a plurality of actuators (*FIG. 1, element 78*) associated with said plurality of nozzles, and an actuators firing logic circuit (*FIG 9, elements 427, 429, 460*), except a decoder for decoding said received composite fire signal thereby producing a plurality of decoded fire signal to energize a plurality actuators.

Inui et al. discloses a printhead having a decoder (*FIG. 7, element 57 receives the COMBINED HEATING DATA signal*) for decoding a received composite fire signal thereby producing a plurality of decoded fire signal to energize a plurality actuators (*FIG. 7, elements R1-R1024*) for perform printing, wherein the decoder is in communication with an actuator firing logic circuit (*FIG. 7, elements FET1-FET1024, 51-55*) for selectively energizing the plurality of actuators.

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the printhead disclosed by Kao et al. to include a decoder for decoding the composite fire signal as disclosed by Inui et al. The motivation for doing so would have been to be able to convert the heat/fire signal transferred in a serial form to a parallel form by the decoder to turn on and off the heating elements as taught by Inui et al. (*column 3, lines 30-42*).

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inui et al. Kao et al. (US 2002/0018086 A1) in view of Inui et al. (US 6344867), as applied to claim 8, and further in view of Arquilevich et al. (US 6578943).

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Kao et al., as modified, discloses the claimed invention as discussed above but is silent wherein said printhead is integral with a printhead cartridge that is in connection to said printhead carrier.

Arquilevich et al. discloses a printing apparatus (*FIG. 1B*) equipped with a carrier (*FIG. 2 and 10, element 20*) for communicatively supporting a plurality of ink cartridges (*FIG. 2 and 10, elements 22, 24, 26, 28*) and a plurality of printheads (*FIG. 3, element 36*), wherein each printhead 36 is integral with an associate ink cartridge (*FIG. 3*) and in fluid communication with an ink reservoir carried by the ink cartridge.

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to structure the printing system disclosed by Kao et al., as modified, to integral the printhead with the ink cartridge as disclosed by Arquilevich et al. The motivation of doing so would have been to provide an ink communication between the printhead and the ink reservoir included in the ink cartridge as taught by Arquilevich et al. (*FIG. 3*).

Response to Arguments

Applicant's arguments filed 03/01/2006 have been fully considered but they are not persuasive.

The applicant argued that Kao's heating pulse 435 provided to all ink jet cells regardless of whether they would eject ink and Umezawa's heating pulse were not fire signals. It is the examiner's point of view that the claim language does not define wherein the fire signal causes ink ejection. Instead, the fire signal interpreted in light of the specification is for energizing the actuators. As a result, each of Kao's heating pulse 435 and Umezawa's heating pulse that are for energizing the actuators (printing elements) anticipates the fire signal as claimed.

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Moreover, the applicant argued that Kao's heating pulse 435 is not part of a fire signal that is asserted at a different timing than other of a plurality of fire signals. In response, the examiner cites that each fire signal of Kao's plurality of fire signals - The first and second heating pulses (435 and 438) - is asserted at a different timing respect to the other in a period of time. It is clearly shown in FIG. 10, for example, that the first heating pulse (435) is asserted at a different timing respect to the second heating pulse (438) in period T1-T2.

Furthermore, the applicant argued that the cited prior art does not teach a plurality of fire signals specific to a particular color or associated with a plurality of ink colors. It is certain that Kao printing system is a black-white and/or color printer, Kao's plurality of heating signals is for a particular color ink (either B, M, C, or Y) contained in a printhead of the printer. Moreover, Umezawa's FIG. 3 shows each of plurality of fire signal is associated with a printhead that is in different color to others.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S. NGUYEN whose telephone number is (571)272-2151.

The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D. MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LN
05/08/2006


STEPHEN MEIER
SUPERVISORY PATENT EXAMINER